

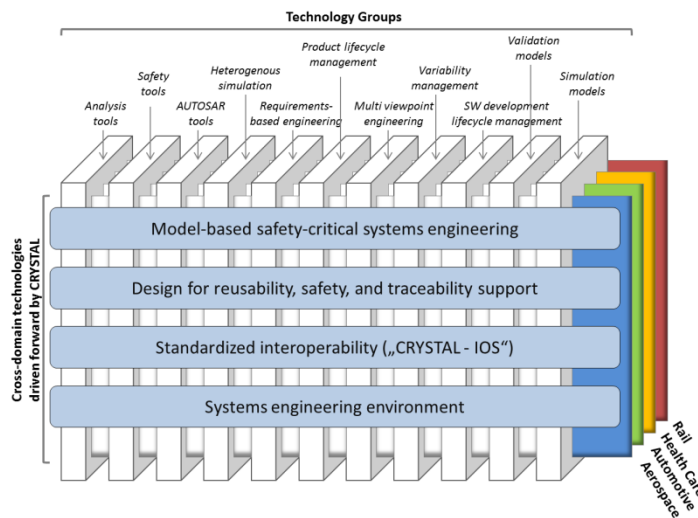


Enabling Seamless Life-Cycle Collaboration for Safety-Critical Systems Engineering

The processes of developing, deploying, governing, operating and maintaining modern safety-critical embedded systems is highly complex and requires specialized tools supporting different activities throughout the entire product life cycle. Therefore, OEMs and suppliers are typically operating a large set of tools from different vendors often complemented by custom in-house solutions. The overall process can be effective and efficient only, if it supports collaboration among all stakeholders and consequently interoperability between the tools they are using. Considering the ongoing outsourcing and globalization activities, *interoperability* and *openness* is getting even more crucial. In addition, the demand for supporting a large number of product variants further increases the complexity to be handled.

Today, tool integration is often done in an ad-hoc manner by creating proprietary bridges between each pair of tools. Such an approach does not scale, since the number of required bridges grows exponentially with the number of employed tools. Moreover, the resulting tool chain becomes extremely vulnerable to common changes like version upgrades from tool vendors, and the efforts for maintaining a large set of bridges is sooner or later no more acceptable. The main technical challenge in addressing this problem is the provision of open and common interoperability technologies supported by the different tools that generate and

provide access to data covering the entire product lifecycle.



The project CRYSTAL (CRITICAL SYSTEM engineering ACCELERATION) has identified this need and takes up the challenge to establish and push forward an *Interoperability Specification (IOS)* as an open European standard for the development of safety-critical embedded systems in the automotive, aerospace, rail and health care domain. This standard will allow loosely coupled tools to share and interlink their data based on standardized and open Web technologies that enable common

interoperability among various life cycle domains. This reduces the complexity of the entire integration process significantly. Compared to many other research projects, CRYSTAL is strongly industry-oriented and will provide ready-to-use integrated tool chains having a mature technology-readiness-level (up to TRL 7). In order to reach this goal, CRYSTAL is driven by real-world industrial use cases from the automotive, aerospace, rail and health sector and builds on the results of successful predecessor projects like CESAR, SAFE, iFEST, MBAT on European and national level.

Creating and establishing a new standard on a large scale in an already consolidated market cannot be achieved by small individual organizations. With a budget of more than 82 million Euro and 68 partners from 10 different European countries, CRYSTAL has the critical mass to accomplish this endeavor. The project consortium is made up of participants from all relevant stakeholders, including OEMs, suppliers, tool vendors and academia.

Throughout the entire project, CRYSTAL will stay in close exchange with standardization organizations like ASAM, ProSTEP iViP, OASIS, OMG, CENELEC and others in order to build up on existing achievements and to join forces through collaboration in the standardization process. The aims of CRYSTAL are ambitious and the expected results will have significant economical and societal impacts.

OEMs will benefit from better supplier collaboration and reduced system design costs due to the improved and the smart integration of system analysis, safety analysis, and system exploration tools. In addition, the CRYSTAL IOS will increase the flexibility for all stakeholders and has the potential to deeply impact the market on a global level. OEMs can easily combine tools from different vendors, and tool vendors will be able to find new market opportunities in an open and extensible environment.

CRYSTAL Facts



Budget: €82 M
Starting Date: May 1st, 2013
Project Duration: 3 years
Consortium: 68 partners, 10 countries

Project Coordinator: AVL List GmbH
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List of Partners

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